



University of Venda

FACULTY OF SCIENCE, ENGINEERING AND AGRICULTURE
DEPARTMENT OF MATHEMATICAL AND COMPUTATIONAL SCIENCE
2024 FIRST SEMESTER SUPPLEMENTARY EXAMINATIONS PAPER

Module Code	:	STA1149/STA1549
Module Name	:	BASIC STATISTICS
Duration	:	3 Hours
Number Of Pages	:	8
Total Marks	:	100
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GENERAL INSTRUCTIONS

1. Notes, files, textbooks, or any other aids are **not** allowed in the examination room.
2. Mobile phones (cell phones), computers and iPads/tablets are **not** allowed.
3. Please remember to write your name, surname and student number on the examination script (answer book).
4. By accepting this examination question paper, you agree to abide by University of Venda's Rules and Regulations.
5. Rough work can only be done in your examination answer book and clearly indicate as such)

MODULE-SPECIFIC INSTRUCTIONS

- Answer all the questions, unless otherwise instructed.
- Read the questions carefully before attempting their answers.
- Clearly number the questions and any sub-questions, using the same numbering as used in this examination paper.

Question 1**[2 × 25 = 50]****Write the question number and the correct letter only!**

1.1 A numerical value used as a summary measure for a sample, such as sample mean, is known as a

- a. Sample statistic b. Sample parameter c. Population parameter d. Population
e. None of the above

1.2 The sum of the percent frequencies for all classes will always equal

- a. 100 b. Number of classes c. The cumulative frequency of the last class d. 1 e. 50

1.3 The sum of the relative frequencies for all classes will always equal

- a. 1 b. Number of classes c. The cumulative frequency of the last class d. 100 e. 50

1.4 Questions 1.4 to 1.7 are based on the following information: The following data show the number of hours worked by 200 statistics students.

Classes	frequency
0-9	40
10-19	50
20-29	70
30-39	40

The class width for this distribution is

- a. 10 b. 9 c. 11 d. 40 e. Varies from class to class

1.5 The number of students working for 19 hours or less is

- a. 90 b. 50 c. 40 d. 10 e. 39

1.6 The relative frequency of students working 9 hours or less

- a. 0.2 b. 0.45 c. 0.40 d. 40 e. 9

1.7 The cumulative relative frequency for the class of 10 – 19

- a. 50 b. 90 c. 200 d. 70 e. 40

1.8 What is the median of the following data set? 8 2 48 4 13

- a. 2 b. 8 c. 48 d. 9 e. 4

1.9 To find the mean of a set of numbers, add up all the items and divide by:

- a. 2 b. Total number of items c. Minimum d. Maximum e. Half

1.10 Which of the following represents the middle value?

- a. Mean b. Median c. Mode d. Standard deviation e. Range

1.11 Which of the following is not a measure of central tendency?

- a. Mode b. variance c. Median d. Mean e. Average

1.12 What number would you divide by to calculate the mean of 3 4 5 6 7

- a. 6 b. 5 c. 3 d. 4 e. 7
- 1.13 Which of the following measures can have more than one value for a set of data?
- a. Median b. Mode c. Range d. Mean
- e. None of the above
- 1.14 What is the term we use to describe the distribution of the data set with one mode?
- a. Multimodal b. Unimodal c. Non-modal d. Bimodal
- e. None of the above
- 1.15 According to the empirical rule, approximately what percentage of normally distributed data lies within two standard deviation of the mean?
- a. 59% b. 95% c. 75% d. 68% e. 99.7%
- 1.16 Based on the following sample of ages (in months) of 18 children at a day care: 36, 42, 18, 32, 22, 22, 25, 29, 30, 31, 19, 24, 35, 29, 26, 36, 24, 28
- The median age of the children is...
- a. 29 b. 28.2 c. 28.5 d. 30.5 e. 31
- 1.17 From question 1.16, the interquartile range for this data set is...
- a. 8 b. 12 c. 9.25 d. 16 e. 10
- 1.18 From question 1.17, the standard deviation of the age of children is...
- a. 41.24 b. 38.95 c. 6.42 d. 10.20 e. 6.24
- 1.19 Measuring theorem which helps in determining proportion of observations for specific interval of mean and standard deviation is classified as
- a. Pearson Theorem b. Sampling theorem c. Chebyshev's theorem
- d. Population theorem e. Empirical rule
- 1.20 Which of the following sets of data has the largest inter – quartile range?
- a. -4 18 32 6
- b. 0 10 -27 3 -15
- c. -1 -11 -31 -101 -71 -61
- d. 5 53 47 21
- e. 6 10 13
- 1.21 Consider the following sample data set:
- 3 -3 6 4 10 -4 10 2 -1 5 1
- Calculate the range of the data set.
- a. 6 b. -3 c. 2 d. 14 e. 4.5

1.22 Refer to information on question 1.21:

Calculate the coefficient of variation for the data set:

- a. 2.45% b. 30% c. 5.0073% d. 204% e. 10%

1.23 The human resources department of a company recorded the number of days absent of 23 employees in the technical department over the past nine months:

5 4 8 17 10 9 30 5 6 15 10 9
2 16 15 18 4 12 6 6 15 10 5

Compute the third quartile of the number of days absent:

- a. 10 days b. 6 days c. 9 days d. 15 days e. 5 days

1.24 Refer to the data on question 1.23:

Find the median number of days absent over this nine-month period:

- a. 15 days b. 10.3 days c. 6 days d. 9 days e. 30 days

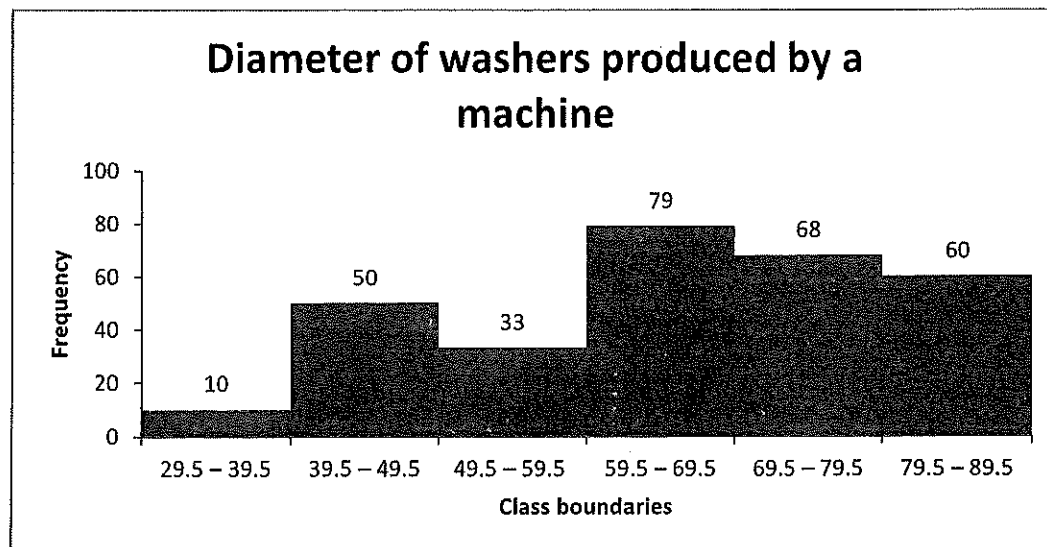
1.25 Techniques used to organize, summarize, and present data that has been collected are known as:

- a. Samples b. inferential statistics c. Populations d. Descriptive
Statistics e. Parameter

QUESTION 2

[29 Marks]

2.1 The diameters of a sample of 300 washers produced by a machine are represented in the graph below:



(a) Comment on the shape of the graph. [1]

(b) Convert the graph to the frequency distribution. [3]

(c) From the frequency distribution calculate the measures of dispersion. [6]

(d) Calculate the lower quartile and the upper quartile. [6]

(e) Calculate the mode. [4]

2.2 A national motor vehicle distributor wishes to find out if the size of a car bought is related to the age of a buyer. From sales transactions over the past two years, a random sample of 300 buyers was classified by size of a car bought and buyer's age. The following cross tabulation table was constructed. Represent the data on the percentage component bar chart. [5]

Buyer's age	Car size bought		
	Small	Medium	Large
Under 25	10	20	30
35 – 40	20	40	40
41 – 50	40	30	40
Over 50	9	9	12

2.3 Twenty five army inductees were give a blood test to determine their blood type. The data set is:

A B B AB O O O B AB B B B O
A O O O AB AB A O B A B A

Draw the bar Chart for these different blood types. [4]

QUESTION 3

[21Marks]

3.1 Given that x (flight times between cities A and B) follows a normal distribution with a mean (μ) of 64 minutes and a standard deviation (σ) of 2.5 minutes, use the standard normal table to find: [8]

(a) $P(x < 62)$

(b) $P(x > 67.4)$

(c) $P(59.6 < x < 62.8)$

3.2 The delivery times for all food orders at a fast-food restaurant during the lunch hour are normally distributed with an average of 8.4 minutes and a standard deviation of 1.8 minutes. Find the probability that the mean delivery time for a random sample of 16 such orders at this restaurant is

(a) Between 8 and 9 minutes

[4]

(b) Within 1 minute of the population mean

[4]

3.3 The service time of the first service of a BMW is found to be normally distributed, with a mean of 70 minutes and a variance of 81 minutes. [4]

(a) What is the probability that the job will take more than an hour and a half?

(b) What percentage of first services will be completed between 50 and 60 minutes?

End of Examination

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02222	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831
-1.9	.02872	.02807	.02743	.02680	.02619	.02559	.02500	.02442	.02385	.02330
-1.8	.03593	.03515	.03438	.03362	.03288	.03216	.03144	.03074	.03005	.02938
-1.7	.04457	.04363	.04272	.04182	.04093	.04006	.03920	.03836	.03754	.03673
-1.6	.05480	.05370	.05262	.05155	.05050	.04947	.04846	.04746	.04648	.04551
-1.5	.06681	.06552	.06426	.06301	.06178	.06057	.05938	.05821	.05705	.05592
-1.4	.08076	.07927	.07780	.07636	.07493	.07353	.07215	.07078	.06944	.06811
-1.3	.09680	.09510	.09342	.09176	.09012	.08851	.08691	.08534	.08379	.08226
-1.2	.11507	.11314	.11123	.10935	.10749	.10565	.10383	.10204	.10027	.09853
-1.1	.13567	.13350	.13136	.12924	.12714	.12507	.12302	.12100	.11900	.11702
-1.0	.15866	.15625	.15386	.15151	.14917	.14686	.14457	.14231	.14007	.13786
-0.9	.18406	.18141	.17879	.17619	.17361	.17106	.16853	.16602	.16354	.16109
-0.8	.21186	.20897	.20611	.20327	.20045	.19766	.19489	.19215	.18943	.18673
-0.7	.24196	.23885	.23576	.23270	.22965	.22663	.22363	.22065	.21770	.21476
-0.6	.27425	.27093	.26763	.26435	.26109	.25785	.25463	.25143	.24825	.24510
-0.5	.30854	.30503	.30153	.29806	.29460	.29116	.28774	.28434	.28096	.27760
-0.4	.34458	.34090	.33724	.33360	.32997	.32636	.32276	.31918	.31561	.31207
-0.3	.38209	.37828	.37448	.37070	.36693	.36317	.35942	.35569	.35197	.34827
-0.2	.42074	.41683	.41294	.40905	.40517	.40129	.39743	.39358	.38974	.38591
-0.1	.46017	.45620	.45224	.44828	.44433	.44038	.43644	.43251	.42858	.42465
-0.0	.50000	.49601	.49202	.48803	.48405	.48006	.47608	.47210	.46812	.46414

STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.50000	.50399	.50798	.51197	.51595	.51994	.52392	.52790	.53188	.53586
0.1	.53983	.54380	.54776	.55172	.55567	.55962	.56356	.56749	.57142	.57535
0.2	.57926	.58317	.58706	.59095	.59483	.59871	.60257	.60642	.61026	.61409
0.3	.61791	.62172	.62552	.62930	.63307	.63683	.64058	.64431	.64803	.65173
0.4	.65542	.65910	.66276	.66640	.67003	.67364	.67724	.68082	.68439	.68793
0.5	.69146	.69497	.69847	.70194	.70540	.70884	.71226	.71566	.71904	.72240
0.6	.72575	.72907	.73237	.73565	.73891	.74215	.74537	.74857	.75175	.75490
0.7	.75804	.76115	.76424	.76730	.77035	.77337	.77637	.77935	.78230	.78524
0.8	.78814	.79103	.79389	.79673	.79955	.80234	.80511	.80785	.81057	.81327
0.9	.81594	.81859	.82121	.82381	.82639	.82894	.83147	.83398	.83646	.83891
1.0	.84134	.84375	.84614	.84849	.85083	.85314	.85543	.85769	.85993	.86214
1.1	.86433	.86650	.86864	.87076	.87286	.87493	.87698	.87900	.88100	.88298
1.2	.88493	.88686	.88877	.89065	.89251	.89435	.89617	.89796	.89973	.90147
1.3	.90320	.90490	.90658	.90824	.90988	.91149	.91309	.91466	.91621	.91774
1.4	.91924	.92073	.92220	.92364	.92507	.92647	.92785	.92922	.93056	.93189
1.5	.93319	.93448	.93574	.93699	.93822	.93943	.94062	.94179	.94295	.94408
1.6	.94520	.94630	.94738	.94845	.94950	.95053	.95154	.95254	.95352	.95449
1.7	.95543	.95637	.95728	.95818	.95907	.95994	.96080	.96164	.96246	.96327
1.8	.96407	.96485	.96562	.96638	.96712	.96784	.96856	.96926	.96995	.97062
1.9	.97128	.97193	.97257	.97320	.97381	.97441	.97500	.97558	.97615	.97670
2.0	.97725	.97778	.97831	.97882	.97932	.97982	.98030	.98077	.98124	.98169
2.1	.98214	.98257	.98300	.98341	.98382	.98422	.98461	.98500	.98537	.98574
2.2	.98610	.98645	.98679	.98713	.98745	.98778	.98809	.98840	.98870	.98899
2.3	.98928	.98956	.98983	.99010	.99036	.99061	.99086	.99111	.99134	.99158
2.4	.99180	.99202	.99224	.99245	.99266	.99286	.99305	.99324	.99343	.99361
2.5	.99379	.99396	.99413	.99430	.99446	.99461	.99477	.99492	.99506	.99520
2.6	.99534	.99547	.99560	.99573	.99585	.99598	.99609	.99621	.99632	.99643
2.7	.99653	.99664	.99674	.99683	.99693	.99702	.99711	.99720	.99728	.99736
2.8	.99744	.99752	.99760	.99767	.99774	.99781	.99788	.99795	.99801	.99807
2.9	.99813	.99819	.99825	.99831	.99836	.99841	.99846	.99851	.99856	.99861
3.0	.99865	.99869	.99874	.99878	.99882	.99886	.99889	.99893	.99896	.99900
3.1	.99903	.99906	.99910	.99913	.99916	.99918	.99921	.99924	.99926	.99929
3.2	.99931	.99934	.99936	.99938	.99940	.99942	.99944	.99946	.99948	.99950
3.3	.99952	.99953	.99955	.99957	.99958	.99960	.99961	.99962	.99964	.99965
3.4	.99966	.99968	.99969	.99970	.99971	.99972	.99973	.99974	.99975	.99976
3.5	.99977	.99978	.99978	.99979	.99980	.99981	.99981	.99982	.99983	.99983
3.6	.99984	.99985	.99985	.99986	.99986	.99987	.99987	.99988	.99988	.99989
3.7	.99989	.99990	.99990	.99990	.99991	.99991	.99992	.99992	.99992	.99992
3.8	.99993	.99993	.99993	.99994	.99994	.99994	.99994	.99995	.99995	.99995
3.9	.99995	.99995	.99996	.99996	.99996	.99996	.99996	.99996	.99997	.99997